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PRINCIPAL INVESTIGATOR: David C. Klonoff

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# POST MEETING REPORT FOURTH ANNUAL CLINICAL DIABETES TECHNOLOGY MEETING APRIL 11-12, 2008 ORLANDO, FLORIDA

The Fourth Annual Clinical Diabetes Technology Meeting was presented by the Diabetes Technology Society at the Orlando, Florida, Hyatt Regency Hotel on April 11-12, 2008. The first day covered Technologies for Diabetes Monitoring and the second day covered Technologies for Diabetes Therapy.

On April 11, 2008, which was the Technologies for Diabetes Monitoring day, the first presentation was made by Barry Ginsberg, M.D., Ph.D., on the topic, "Self-Monitoring of Blood Glucose." He explained the use of self monitoring of blood glucose for clinical decision making and addressed issues with glucose monitoring, including common user errors that can interfere with accuracy.

Howard Wolpert, M.D., presented an overview of Continuous Glucose Monitoring (CGM) technology. He described how metabolic monitoring with continuous glucose monitoring can provide information about nutritional and metabolic status that is unavailable with spot glucose testing.

Jennifer Block, R.N., CDE, discussed the concept of CGM as a behavior modification tool. She explained how, to modify eating habits and exercise habits based on CGM and also achieve improved medication compliance with CGM. She discussed how with CGM, patients must confront seeing all of their glucose readings demonstrated for days at a time, and she referred to this phenomenon as "naked diabetes."

Darrell Wilson, M.D., discussed glycemic variability. He pointed out how useful it can be to utilize the data provided by continuous glucose monitoring to determine therapy of diabetes. He provided examples of glycemic patterns that can be discerned through this monitoring technology.

Bruce Buckingham, M.D., gave a live demonstration on the "Interpretation of Continuous Glucose Data." He presented case study examples of how continuous glucose monitoring can provide insight into patient behavior and assist in determining drug and diet therapy.

He described strategies for modifying insulin dosages and timing to improve control, as measured by CGM.

Jill Abelseth, M.D., described the policies of reimbursement for continuous glucose monitoring through her experience with government payers and insurance payers for determining coding, coverage, and payment for new monitoring technologies, such as continuous glucose monitoring devices. She emphasized the need for physicians to communicate with these payers to effect establishment of favorable policies for the use and reimbursement of these new technologies.

John Buse, M.D., Ph.D., presented an update on A1C and mean blood glucose reporting. He described how Hemoglobin A1C and mean glucose levels correlate and explained why the concept of mean blood glucose was developed.

Lois Jovanovic, M.D., discussed technology for monitoring and managing diabetes in pregnancy. She demonstrated that there is a need for detection of diabetes in women of childbearing years and how controlled insulin delivery and the use of CGM promotes optimal maternal and fetal health during pregnancy with diabetes.

Michael Rocco, M.D., explained how to select noninvasive cardiovascular imaging tests for patients with diabetes. He described how noninvasive testing measures cardiac structure and function, as well as how to determine which patients with diabetes require noninvasive CV testing. He described a variety of emerging imaging technologies. LTC Tom Sauerwein, M.D., FACE, spoke on the topic of "Establishing an Electronic Medical Record (EMR) for a Diabetes Clinic." He described how EMR can lead to improved outcomes for patients with diabetes. He also explained how EMR can lead to improved recruiting for research trials.

In this session, entitled "Patient Panel: Living with Continuous Glucose Monitoring," five patients who used three different continuous glucose monitors, between them, discussed benefits and drawbacks of having access to real-time glucose values and how this technology has improved their glycemic control. The patients (and one mother of a child panelist) were interviewed by the panel moderators, Paula Jameson, M.S.N., ARNP, and Irina Nayberg, R.N.

On April 12, 2008, which was the Technologies for Diabetes Therapy day, the first presentation was made by G. Alexander Fleming, M.D. on "Thiazolidinedione Therapy." He explained what went right and what went wrong with this family of drugs from a regulatory perspective. He explained how the mechanism of action of these drugs led not only to improved glycemic control, but to clinically significant congestive heart failure and clinically significant anemia, as well as even coronary artery disease.

Alan Garber, M.D., Ph.D., FACE, presented a lecture on "Incretin Therapy vs. DPP4 Inhibitor Therapy." He covered mechanisms of action of Incretin hormones and DPP-4 agonists, side effects of these drugs, and how patients can benefit from thiazolidinediones and DPP-4 agonists.

Lawrence Blonde, M.D., FACP, FACE, explained when and how to initiate insulin therapy in type 2 diabetes. He explained the use of short-acting pre-meal dosing as well as long-acting basal insulin.

Jeffrey Joseph, D.O., and Curtiss Cook, M.D., FACE, spoke on "Hospital Management of Diabetes." They explained the need for intensive glycemic control in hospital patients. They explained that hyperglycemia may precede or become part of a hospitalization as a stress response. They supported that clinical outcomes are adversely affected by hyperglycemia.

Linda Schrock, M.N., R.N., BC-ADM, CDE, and Paula Jameson, M.S.N., ARNP, presented an overview of the latest devices for managing diabetes entitled "Pens, Pumps, and Dosing Software: The Latest Devices." They demonstrated examples of insulin pens, pumps, and software for determining insulin dosages.

Lori Laffel, M.D., discussed insulin pumps in the schools. She began her talk with statistics associated with pumps used in the pediatric population, continued with conditions and needs of the school nurse, and ended with explaining the need for additional training to understand patient's needs and pumps.

Curtiss Cook, M.D., FACE presented on insulin pumps in the hospital, illustrating his presentation with case studies of pumps in the hospital and how self-management of pumps can be effective in the hospital under controlled conditions.

Bruce Bode, M.D., FACE, opened his presentation with engaging audience response questions about clinicians and downloading pump information, and then went on to

presenting various meters, pumps and available software choices. He also presented data about the performance of Glucommander software for hospital management of hyperglycemia.

Stuart Weinzimer, M.D., addressed the practical considerations of sensor augmented pump therapy and engaged the audience by using the audience response system to explore the question, "How do we use pumps and sensors?" He included challenges and benefits of utilizing continuous glucose monitors linked to insulin delivery systems. Ruth Weinstock, M.D., presented an overview of telemedicine for managing diabetes. With a short video, she illustrated a case of remote use of telemedicine for a non-ambulatory patient. She stated that considerations in the use of telemedicine include data entry, accurate transmission, securely controlled access, auditing capability, reliability, stability, and cost of equipment. Also, she pointed out how the internet has been used in diabetes education and how telemedicine has been used in correctional facilities.

Tim Wysocki, Ph.D., ABPP, spoke on "Children with Diabetes – Strategies to Increase Compliance." From his research and experience as a psychologist, he presented case study statistics and behavioral interventions on the presentation topic and emphasized the benefits of motivational interviewing.

Robert Gabbay, M.D., Ph.D., began his presentation on "Adults with Diabetes –
Strategies to Increase Compliance" by using the audience response system to engage the clinicians with questions as to how they teach patients. In his talk he presented the idea of motivational interviewing and the website <a href="www.motivationainterviewing.org">www.motivationainterviewing.org</a> for practical suggestions such as using open ended questions, and commenting with statements resembling "It sounds like..." or "you mean that..." or "you're wondering if..." or "so you feel..." The meeting concluded with a panel discussion on the future of diabetes technologies. This panel of technology experts, which included Bruce Bode, M.D., FACE, Jeffrey Joseph, D.O., Lori Laffel, M.D., and Stuart Weinzimer, M.D., fielded questions from the audience. Topics included: making devices smaller, utilization of algorithms for insulin dosing, closed-loop development, alarms that sound in other rooms, further development of tight glucose monitoring in hospitals, continuous glucose monitors, intravascular glucose monitors, and the future of telemedicine.

During the meeting, the speakers asked questions to the audience about their preferences for treatments. The questions were then answered and the results were tabulated in real time. A sample of these questions and the audience responses are contained in figures 1-8.

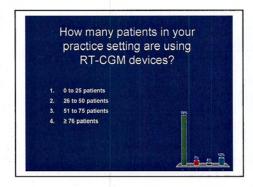


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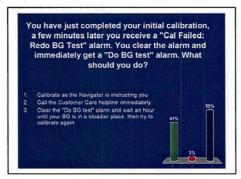


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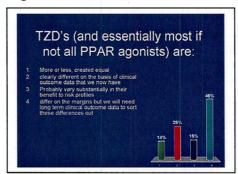


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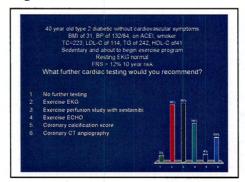


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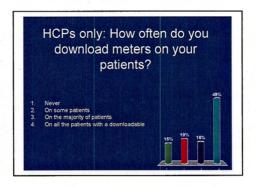


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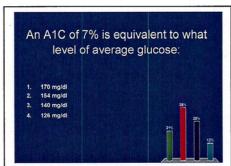


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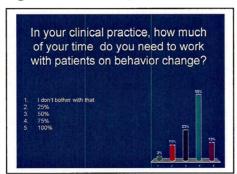


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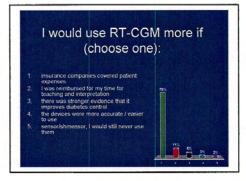


Fig. 8

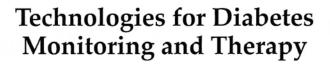
The conclusions of the meeting speakers and organizers were that: 1) technology is contributing to better devices for monitoring diabetes; 2) technology is contributing to better drug delivery systems for treating diabetes; and 3) technology will improve outcomes in diabetes and other diseases requiring ongoing monitoring and therapy.

## Fourth Annual

# CLINICAL DIABETES TECHNOLOGY MEETING

Friday/Saturday
April
11-12, 2008

A PRACTICAL COURSE FOR CLINICIANS TAUGHT BY CLINICIANS



Hyatt Regency Orlando International Airport

Presented by:



DIABETES TECHNOLOGY SOCIETY

Applying science and engineering to fight diabetes



## Developed in cooperation with:

- · Yale University, Department of Pediatrics
- · Stanford University, Department of Pediatrics
- UCSF Diabetes Center
- Pennsylvania State University, Department of Medicine
- Barbara Davis Center for Childhood Diabetes/ University of Colorado
- US Army
- Mills-Peninsula Health Services

## Meeting supported by educational grants from:

- · Abbott Diabetes Care
- · Amylin-Lilly
- Bayer Healthcare, Diabetes Care
- Becton, Dickinson and Company
- · LifeScan, Inc.
- · Medtronic Diabetes
- Merck & Co., Inc.
- Novo Nordisk A/S

## Planning Committee:

- David Klonoff, MD, FACP, Chair
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   Services, San Mateo, California, and Department of
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   Editor, Journal of Diabetes Science and Technology
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   Department of Medicine, Pennsylvania State
   University, Hershey, Pennsylvania
- Satish Garg, MD
   Departments of Pediatrics and Medicine, Barbara
   Davis Center for Childhood Diabetes, University of Colorado, Aurora, Colorado
- Stephen Gitelman, MD
   Department of Pediatrics, University of California at San Francisco, San Francisco, California
- Jeffrey Joseph, DO
   Artificial Pancreas Center and Department of Anesthesiology, Thomas Jefferson University, Philadelphia, Pennsylvania
- Robert Vigersky, MD
   Diabetes Institute, Walter Reed Army Medical Center, Washington, DC
- Stuart Weinzimer, MD
   Department of Pediatrics, Yale University,
   New Haven, Connecticut
- Darrell Wilson, MD
   Department of Pediatrics, Stanford University,
   Palo Alto, California
- Howard A. Wolpert, MD
   Joslin Diabetes Center, Harvard University,
   Boston, Massachusetts



# Friday, April 11, 2008

## **Technologies for Diabetes Monitoring**

08:00	Welcome: First Day David Klonoff, MD, FACP Mills-Peninsula Health Services, San Mateo, California and UCSF, San Francisco, California		
08:05	Self-Monitoring of Blood Glucose  Barry Ginsberg, MD, PhD  Diabetes Technology Consultants, Wyckoff, New Jersey		
08:45	Overview of Continuous Glucose Monitoring Technology  Howard Wolpert, MD  Joslin Diabetes Center, Harvard University, Boston, Massachusetts		
09:25	Continuous Glucose Monitoring as a Behavior Modification Tool Jennifer Block, RN, CDE Stanford University, Palo Alto, California		
10:05	Break (refreshments provided)		
10:30	Glycemic Variability Darrell Wilson, MD Stanford University, Palo Alto, California		
11:10	Live Demonstration of Interpretation of Continuous Glucose Data Bruce Buckingham, MD Stanford University, Palo Alto, California		
11:50	Reimbursement for Continuous Glucose Monitoring Jill Abelseth, MD Endocrine Group, Albany, New York		
12:30	Lunch (provided)		
13:40	Update on A1C and Mean Blood Glucose Reporting  John Buse, MD, PhD, CDE, FACE  University of North Carolina, Chapel Hill, North Carolina		
14:20	Technology for Monitoring and Managing Pregnancy in Diabetes  Lois Jovanovic, MD  Sansum Diabetes Research Institute, Santa Barbara, California		
15:00	How to Select Noninvasive Cardiovascular Imaging Tests Michael Rocco, MD Cleveland Clinic, Cleveland, Ohio		
15:40	Break (refreshments provided)		
16:05	Establishing an Electronic Medical Record for a Diabetes Clinic LTC Tom Sauerwein, MD, FACE US Air Force, Wilford Hall, San Antonio, Texas		
16:45	Patient Panel: Living With Continuous Glucose Monitoring Paula Jameson, MSN, ARNP Nemours Children's Clinic, Orlando, Florida		
	Irina Nayberg, RN Mills-Peninsula Health Services, San Mateo, California		
17:45	Adjourn		

## Saturday, April 12, 2008

## **Technologies for Diabetes Therapy**

10	chilologies for Diabetes Therapy			
08:00	Welcome: Second Day David Klonoff, MD, FACP Mills-Peninsula Health Services, San Mateo, Californi	a and UCSF, San Francisco, California		
	MEDICAL MANAGEMENT OF TYPE 2 DIABETES			
08:05	Thiazolidinedione Therapy: What Went Right and What Went Wrong?  G. Alexander Fleming, MD  Kinexum LLC, Harper's Ferry, West Virginia			
08:25	Incretin Therapy vs. DPP4 Inhibitor Therapy Alan Garber, MD, PhD, FACE Baylor College of Medicine, Houston, Texas			
08:45	When and How to Initiate Insulin Therapy in Type 2 I Lawrence Blonde, MD, FACP, FACE Ochsner Clinic Foundation, New Orleans, Louisiana	Diabetes		
09:05	Panel Discussion Lawrence Blonde, MD, FACP, FACE Ochsner Clinic Foundation, New Orleans, Louisiana	G. Alexander Fleming, MD Kinexum LLC, Harper's Ferry, West Virginia		
	Alan Garber, MD, PhD, FACE Baylor College of Medicine, Houston, Texas			
09:25	Hospital Management of Diabetes  Jeffrey Joseph, DO  Thomas Jefferson University, Philadelphia, Pennsylvan	nia		
	Curtiss Cook, MD, FACE Mayo Clinic, Scottsdale, Arizona			
10:05	Break (refreshments provided)			
10:30	Pens, Pumps, and Dosing Software: The Latest Device Linda Schrock, MN, RN, BC-ADM, CDE Elkhart General Hospital, Elkhart, Indiana	s		
	Paula Jameson, MSN, ARNP Nemours Children's Clinic, Orlando, Florida			
11:10	Insulin Pumps in the Schools and the Hospital Lori Laffel, MD Joslin Diabetes Center, Harvard University, Boston, M	assachusetts		
	Curtiss Cook, MD, FACE Mayo Clinic, Scottsdale, Arizona			
11:50	Software for Diabetes Bruce Bode, MD, FACE Atlanta Diabetes Associates, Atlanta, Georgia			
12:30	Lunch (provided)			
13:40	Sensor Augmented Pump Therapy: Practical Consider Stuart Weinzimer, MD Yale University, New Haven, Connecticut	ations		
14:20	Telemedicine for Managing Diabetes Ruth Weinstock, MD SUNY, Upstate Medical University, Syracuse, New York			
15:00	Break (refreshments provided)			
	MOTIVATING STRATEGIES TO INCREASE PATIENT COMPLI	ANCE WITH DIABETES THERAPY		
15:25	Children with Diabetes – Strategies to Increase Comp. <i>Tim Wysocki, PhD, ABPP</i> Nemours Children's Clinic, Jacksonville, Florida	liance		
16:05	Adults with Diabetes – Strategies to Increase Complia Robert Gabbay, MD, PhD Pennsylvania State University, Hershey, Pennsylvania	nce		
16:45	Future of Diabetes Technology: Panel Discussion Bruce Bode, MD, FACE Atlanta Diabetes Associates, Atlanta, Georgia	Jeffrey Joseph, DO Thomas Jefferson University, Philadelphia, Pennsylvania		
	Lori Laffel, MD Joslin Diabetes Center, Harvard University, Boston, Massachusetts	Stuart Weinzimer, MD Yale University, New Haven, Connecticut		
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Adjourn

17:45

# MEETING ANNOUNCEMENT

## **Eighth Annual**

## DIABETES TECHNOLOGY MEETING

Applying science and engineering to fight diabetes

## November 13 - 15, 2008 Marriott Bethesda Hotel

#### Presented by DIABETES TECHNOLOGY SOCIETY

www.diabetestechnology.org

#### PRE-MEETING WORKSHOPS

- Intellectual Property for Diabetes Technology Balancing the interests of inventors, developers, manufacturers, and investors
- Technology to Assess Diet and Exercise Measuring calories in and out
- Noninvasive Glucose Monitoring Measuring glucose optically
- Diabetes Information Management Transmitting, storing, and analyzing data to improve care

#### **MEETING TOPICS**

- Technologies for Metabolic Monitoring New methods for measuring glucose and markers of glycemic control
- Nanotechnology for Glucose Sensors Measuring glucose on a small scale
- Artificial Pancreas Including automatic glucose sensors, insulin delivery systems, and feedback control
- Insulin Delivery Technology Novel methods for avoiding painful needle injections
- Tissue Engineering for Insulin Production Nurturing islet cells to function in an abiotic environment
- **Technologies for Improving Compliance** With Diabetes Therapy

How to inspire patients to actually use the technology

#### PROGRAM HIGHLIGHTS

- **Two Poster Sessions** Posters will be presented during two evening receptions on October 25, 2007 and October 26, 2007
- Annual Diabetes Technology Survey Results will be presented and discussed in real-time throughout the meeting
- Live Demonstrations

#### ABSTRACT SUBMISSION

- Deadline to submit: July 03, 2008
- For information on how to submit an Abstract go to: www.diabetestechnology.org
- Abstracts will be published in Journal of Diabetes Science and Technology, distributed to all meeting attendees, and considered for oral and poster presentation.

### PETERSON STUDENT RESEARCH AWARDS

- Gold \$1000 / Silver \$500 / Bronze \$300
- Also includes travel, lodging, and registration for best 3 Diabetes Technology Abstracts first-authored by students

#### **IN COOPERATION WITH**

- Centers for Disease Control and Prevention
- US Army
- UC Berkeley Department of Bioengineering
- Georgia Tech/Emory Center for the Engineering of Living Tissues
- Mills-Peninsula Health Services
- Journal of Diabetes Science and Technology

### PLANNING COMMITTEE

- David C. Klonoff, MD, FACP, Chair Mills-Peninsula Health Services, San Mateo; University of California, San Francisco, California Editor, Journal of Diabetes Science and Technology
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- Jan Wojcicki, PhD, DSc, Institute of Biocybernetics, Warsaw, Poland

#### For more information

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